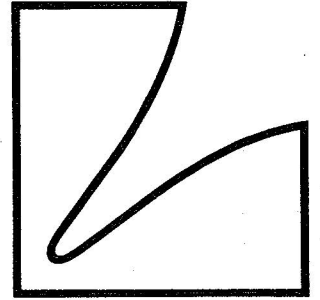
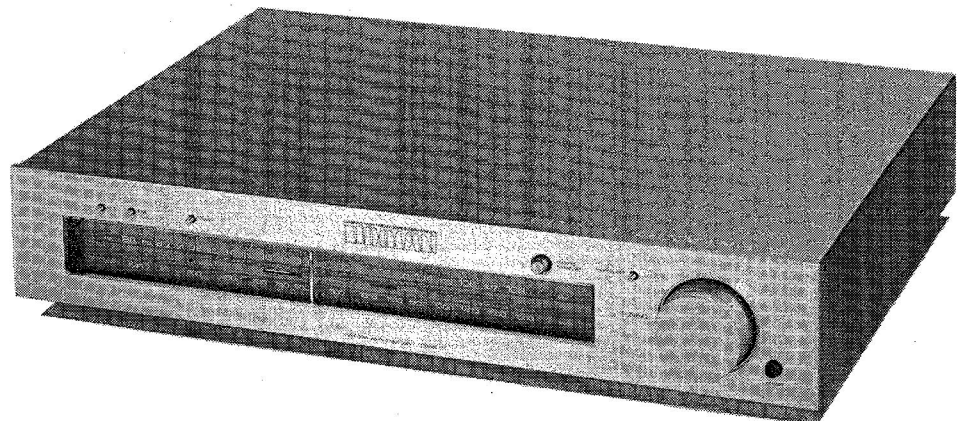


SERVICE MANUAL

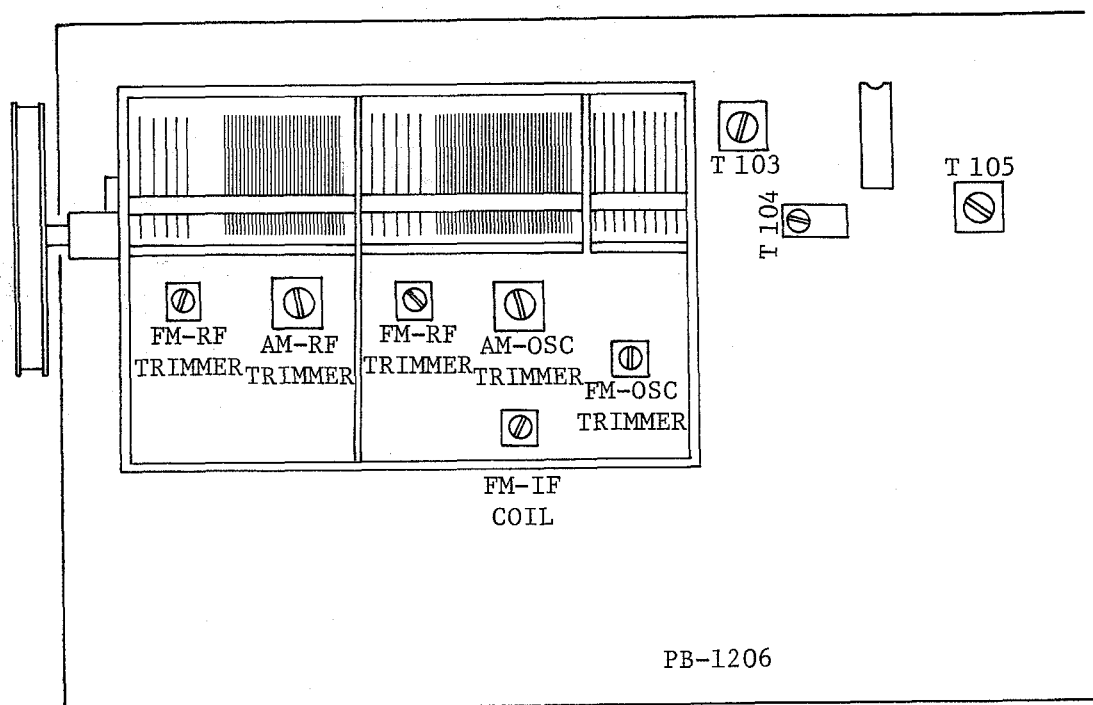


SOLID STATE AM/FM **T-2**
STEREO TUNER

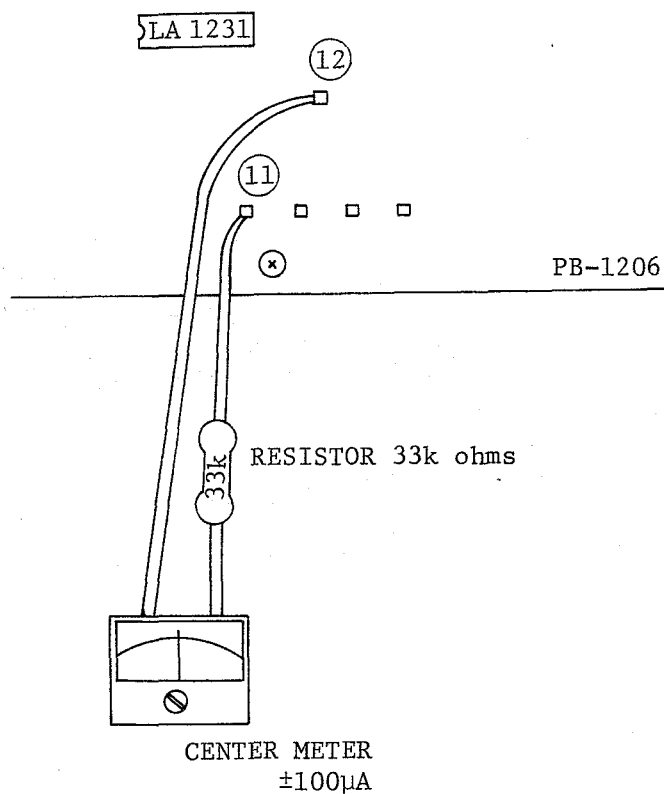


ALIGNMENT PROCEDURE

[Location of Trimmer Capacitors and Coils]



- | Step | Process |
|------|--|
| 1. | Set the VR101 to the endmost clockwise position. |
| 2. | Set the VR104, VR105 VR106 at the center. |
| 3. | Connect a resistor 33K ohms in series to the center meter ($\pm 100\text{MA}$), and connect it to the terminals (11) and (12) of the PB1206. |



4. Set each switch on the front panel in the following manner.
 - a) the AM-FM selector switch to FM (depressed)
 - b) the FM-MONO switch to "auto stereo" (protruded)
 - c) the muting switch to "off" (depressed)
 - d) the muting volume to the endmost counter-clockwise position
5. Connect the measurement instruments in the following manner.
 - a) Connect the tuner output terminal on the back panel with the milli-volt meter, distortion meter and oscilloscope.
 - b) Connect the output of FM SG to the 300 ohms terminal through the matching network.

- FRONT-END-

6. Reduce the output of FM SG to minimum.
7. Set the tuner at interstation position, and adjust the core of the T101 to obtain the " ± 0 " indication at the center meter.
8. Tune in to 108MHz (Place the dial pointer at 108MHz).
9. Set FM SG at 108MHz, and obtain the output of 2uV with "400Hz, 100%" modulation.
10. Adjust the FM oscillator trimmer at front-end to receive the signals from FM SG at the center of the center tuning meter.
11. Adjust the RF trimmer and inter-stage trimmer to obtain the max. sensitivity of tuner. (See to it that the output is maximum and that distortion is minimum.)
12. Set FM SG at 87.5MHz and obtain the output of 2uV.
13. Turn the dial knob to receive the signals from FM SG at the center of the center meter.
14. Confirm that the dial calibration error in step (13) is within the width of the dial pointer.

If the error is found beyond allowance, shift the dial pointer and repeat the steps (8) - (14).
15. Set the tuner and FM SG at the middle position of the dial scale having no broadcast station.
16. Adjust the core of front-end IFT to obtain the max. output of the tuner.
17. Set FM SG to provide "1kHz, 100%" modulation.
18. Adjust the core of the T102 to obtain the minimum distortion at the tuner's output.

19. Reduce the FM SG output to the minimum level.
20. Adjust the core of the T101 to obtain the ± 0 indication of the center meter.
21. Repeat the steps (17) - (20) 2 or 3 times so that the distortion can be suppressed down to the specified level with the center meter at the center position.
22. Set the output of FM SG at 10uV.
23. Set the output of FM SG at 10uV.
24. Vary the FM SG output and confirm that all LED's light up and put off in order.
25. Set the output of FM SG at 100uV.
- 25-B Confirm that the operational bandwidth of the center tuning LED is about $\pm 10\text{KHz}$ during the tuning operation and that it becomes about $\pm 50\text{KHz}$ in 10 sec. after center tuning is completed.
26. Turn the tuning knob, and confirm that the center position of the center meter accords to the point where 2 center tuning LED's light up. Also confirm that they light up one after another.
27. Turn in to the position where 2 center tuning LED's light up, and confirm that they are kept lit within the variation of the FM SG output from 10uV to 10mV.
28. Set the output of FM SG to 100uV.
29. Turn on the muting switch. (protruded)
30. Confirm that the muting functions in the vicinity of $\pm 30\text{KHz}$ while turning the tuning knob.
31. Fix the dial pointer at the point where 2 center LED's light up.
32. Vary the FM SG output, and confirm that the signals are available at about 6uV.
33. Set the muting volume on the front panel to the dead clockwise position.
34. Vary the FM SG output, and confirm that the signals are available at about 300uV.
35. Remove the connection of the center meter made in the step (3)
- STEREO -
36. Set the FM SG output at 1mV with no modulation.
37. Connect a frequency counter to the terminal No. 70 and GND point on PB1206.

38. Adjust the VR104 to read 76KHz $\begin{smallmatrix} + 0 \\ -10 \end{smallmatrix}$ Hz on the frequency counter.
39. Remove the connection of the frequency counter at the step (37).
40. Set FM SG into stereo modulation (19KHz pilot signal 10%, 1KHz L+R 90%)
41. Adjust the VR105 to obtain the max. separation with proper balance between L and R.
42. Check the stereo distortion, and confirm it below the specified level.
43. Confirm that monaural reception is possible with depressing the MONO Switch on the front panel.
44. Also Confirm that all rated specs are satisfied.

- European "S" type unit requires following additional steps -

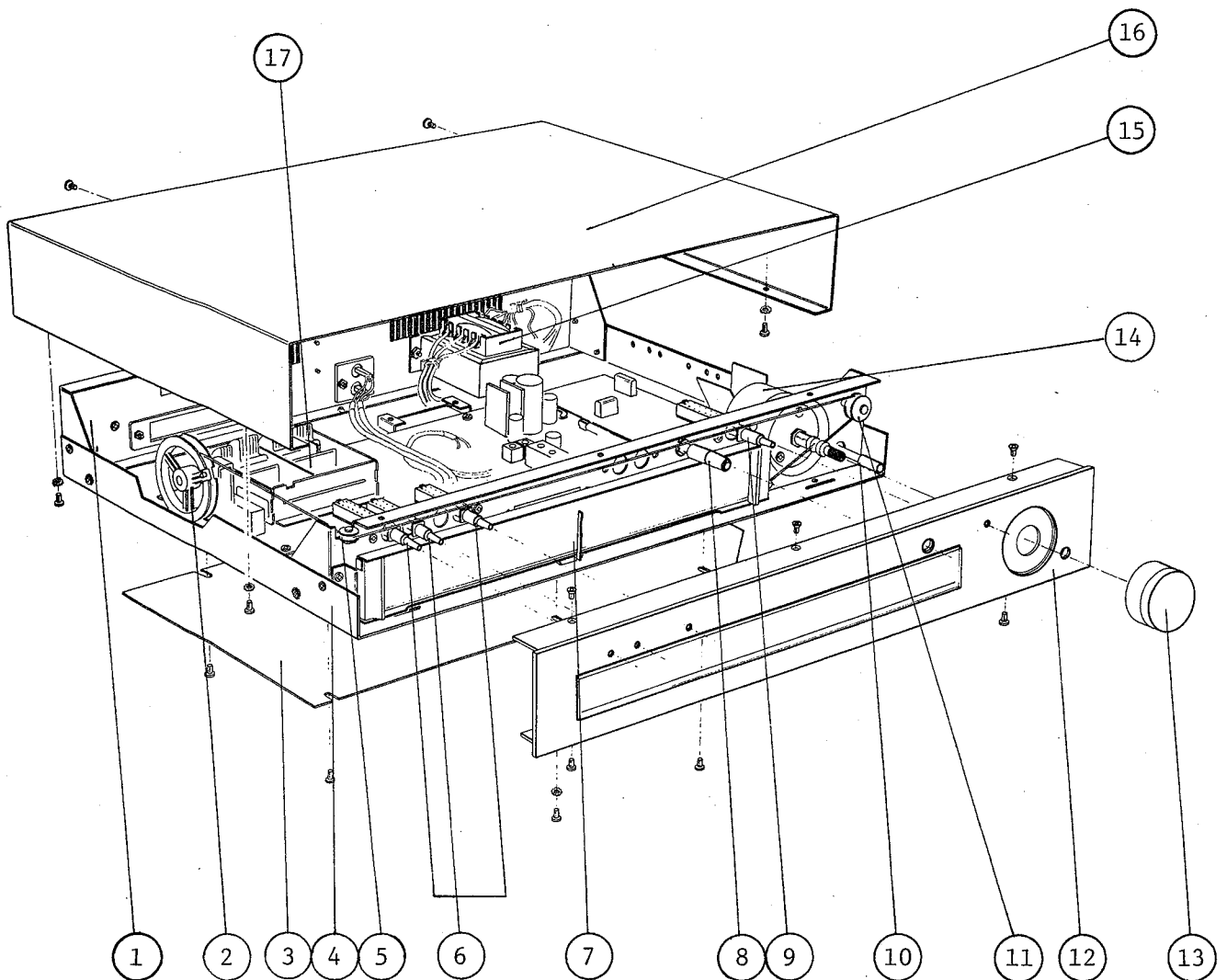
- A) Set FM SG to the center position of the dial scale having no broadcast station, and provide 1mV output with "1KHz, 100%" modulation.
- B) Connect a milli-volt meter to the No. 15 terminal and GND point of the PB1206.
- C) Set the indication of the milli-volt meter to 0dB.
- D) Set the modulation frequency to 60KHz, and confirm that the indication of the milli-volt meter is within -0.5dB.
- E) Change the modulation frequency to 70KHz, and confirm that the milli-volt meter's indication exceeds -11dB.

[AM Section]

45. Set the AM-FM switch to AM position.
46. Connect the output of 455KHz Sweep Generator (SPG) to the No. 64 terminal and GND position of the PB1206.
47. Connect the SPG input to the No. 69 terminal and GND.
48. Set SPG to "output 40-50dB, sweep speed 10Hz".
49. Adjust the T104 and T105 so that the IF wave-form can be symmetrical and that the output can be maximum. At this time, it is easy to observe the wave-form if the AM tuning capacitor is set at the least capacitive position.
50. Disconnect the SPG.
51. Connect the output of AM SG to the specified loop-stick antenna.
52. Set the frequency of the AM SG at 1,400KHz, output 50dB/m, modulation 400Hz, 30R.
53. Tune into 1,400KHz on the dial scale, and adjust the trimmer of AM-Oscillator to receive the signals from AM SG.

54. Adjust the AM RF trimmer to obtain the max. output of tuner.
55. Set the AM SG frequency to 600KHz, output 50dB/m, modulation 400Hz, 30%.
56. Turn the tuning knob to tune in at 600KHz on dial.
57. Adjust the core of the T103 to receive the signals from AM SG.
58. Adjust the core of the bar antenna to obtain the max. output of tuner.
59. Repeat the steps (52) - (58) 2 or 3 times, and confirm that the dial calibration error is within the limit of specs.
60. Set AM SG to "1MHz, 80dB/m output".
61. Adjust the VR106 so that 3 LED's should light up.
62. Confirm that all AM specs are satisfied.

EXPLODED VIEW



1. UC1121 Rear Panel (E,S)
UC1129 " " (U)
2. BX1006 Dial Drum
3. UE1097 Bottom Plate
4. UA1052 Chassis
5. BX0029 Pulley 13 m/m
6. WJ1107 Mould Knob
7. UZ1163 Dial Pointer
8. WH1083 Knob Set
9. WJ1107 Mould Knob

10. WJ1089 Mould Knob
11. BX7017 Pulley
12. WA1183 Panel
13. WH1082 Knob Set
14. UX1009 Fly Wheel
15. PT2301 Power Trans. (U)
PT2302(A) " " (S)
PT2344 " " (E)
16. UG1017 Bonnet (U)
UG1018 " (E,S)
17. LA1909 Front End

Replacement Parts List

REMARKS

Capacitors: C.....ceramic, E.....electrolytic, M.....mylar, G.....G capacitor
 S.....styrol, T.....tantalum, Mi.....mica, MP....MP capacitor
 O.....oil capacitor, TRIM.....trimmer capacitor, AC....AC capacitor
 BP....electrolytic Bi-Polar type

Resistors: 5%, 1/4W, unless specified otherwise

Type: (S)...model for north European countries (E)...standard model
 (U)...model for U.S.A. and CANADA (J)...model for JAPAN

PB1206A

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
R107	RB0158	R-25 100
113	0174	" 470
114	0200	" 5.6k
115	0154	" 68
116	0170	" 330
117	0174	" 470
118	0192	" 2.7k
119	0168	" 270
120	0170	" 330
121	0158	" 100
126	0158	" 100
R137	RB0210	" 15k
140	0198	" 4.7k
141	0224	" 56k
142	0154	" 68
143	0170	" 330
144	0158	" 100
R148	RB0218	" 33k
149	0218	" 33k
150	0174	" 470
151	0158	" 100
152	0158	" 100
153	0206	" 10k
154	0222	" 47k
155	0142	" 22
156	0224	" 56k
157	0214	" 22k
158	0204	" 8.2k
159	0188	" 1.8k
160	0214	" 22k
161	0166	" 220
162	0214	" 22k
163	0214	" 22k
164	0214	" 22k
165	0222	" 47k
166	0206	" 10k
167	0150	" 47
168	0174	" 470
169	0194	" 3.3k
170	0194	" 3.3k
171	---	
172	RB0206	R-25 10k
173	0206	" 10k
174	0174	" 470
175	---	
176	0150	" 47
177	0210	" 15k
178	0206	" 10k
179	0230	" 100k

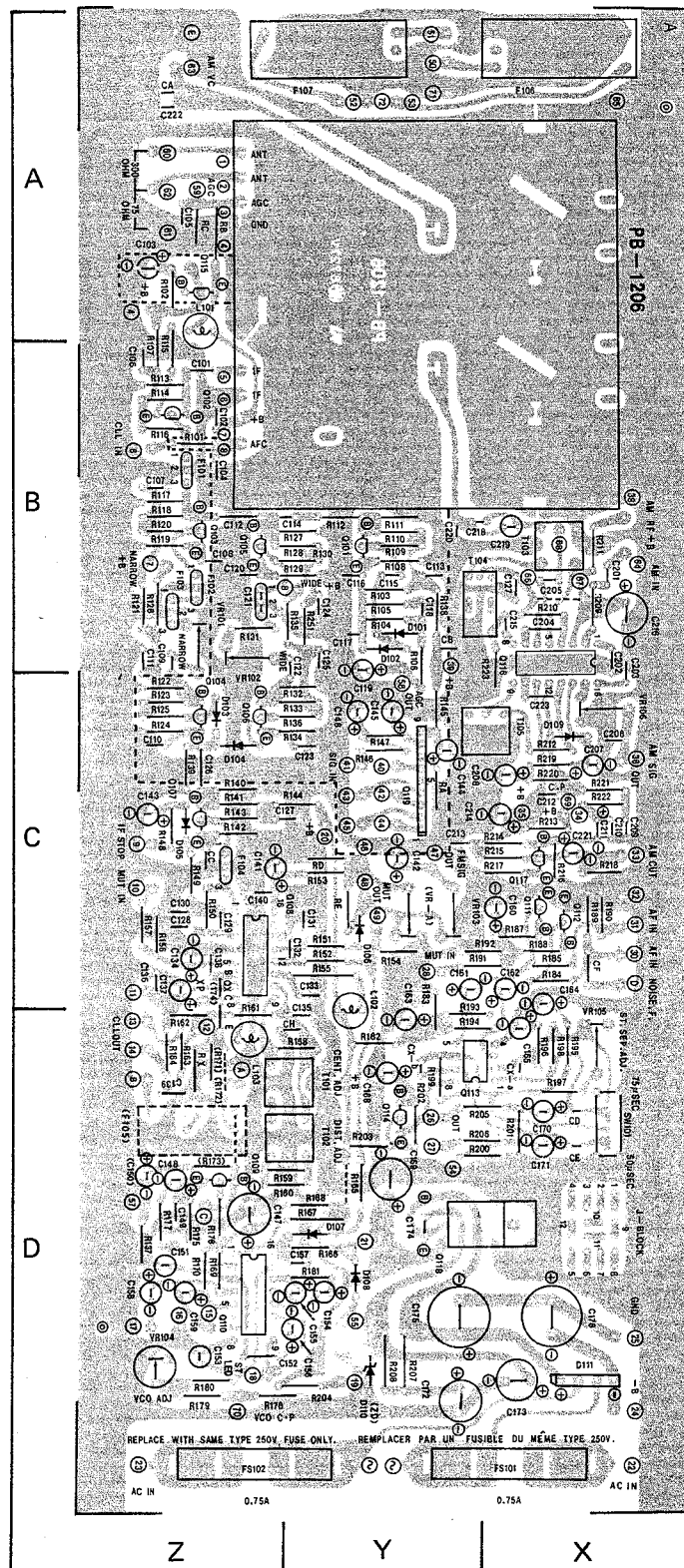
SYMBOL NO.	STOCK NO.	DESCRIPTIONS
R180	RB0210	R-25 15k
181	0182	" 1k
182	0222	" 47k
183	0222	" 47k
184	0194	" 3.3k
185	0194	" 3.3k
186	0182	" 1k
187	0206	" 10k
188	0206	" 10k
189	0194	" 3.3k
190	0194	" 3.3k
191	0206	" 10k
192	0222	" 47k
193	0230	" 100k
194	0230	" 100k
195	0190	" 2.2k
196	0190	" 2.2k
197	0198	" 4.7k
198	0218	" 33k
199	0218	" 33k
200	0206	" 10k
201	0206	" 10k
202	0222	" 47k
203	0134	" 10
204	0184	" 1.2k
205	0142	" 22
206	0142	" 22
207	RD0260	R-50 270
208	RD0051	R1/4 270
209	RB0134	R-25 10
210	0186	" 1.5k
211	0166	" 220
212	0170	R-25 330
213	0158	" 100
214	0234	" 150k
215	0184	" 1.2k
216	0216	" 27k
217	0164	" 180
218	0198	" 4.7k
219	0206	" 10k
220	0206	" 10k
221	0192	" 2.7k
222	0216	" 27k
223	0200	" 5.6k
RB	RB0216	R-25 27k
RC	0210	" 15k
---	0206	" 10k
---	0182	" 1k
Jumper	RG0030	JPW-03

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
C101	CK0155	0.01 μ F C
102	0158	0.047 μ F C
103	---	
104	---	
105	CK0158	0.047 μ F C
106	0158	" C
107	0158	" C
108	0158	" C
109	---	
110	---	
111	CK0158	0.047 μ F C
126	CK0156	0.022 μ F C
127	CK0158	0.047 μ F C
128	0158	" C
129	0158	" C
130	0158	" C
131	0158	" C
132	0158	" C
133	0158	" C
134	CE0099	2.2 μ F 50V E
135	CK0158	0.047 μ F C
136	0158	" C
137	CE0213	0.47 μ F 50V E
138	CC0007	100pF C
139	CK0158	0.047 μ F C
140	---	
141	CK0158	0.047 μ F C
142	---	
143	CE0099	2.2 μ F E
144	---	
145	---	
146	---	
147	CE0079	220 μ F 25V E
148	0075	22 μ F 16V E
149	CC0011	470 μ F C
150	CE0075	22 μ F 16V E
151	CQ0170	470pF S
152	CQ0009	0.047 μ F M
153	CQ0170	470pF S
154	CE0168	3.3 μ F 50V E
155	0098	1 μ F 50V E
156	CS0445	0.22 μ F 35V T
157	CK0155	0.01 μ F C
158	CE0099	2.2 μ F 50V E
159	CE0099	2.2 μ F 50V E
160	CE0098	1 μ F 50V E
161	CS0445	0.22 μ F 35V T
162	0445	0.22 μ F 35V T
163	CE0084	4.7 μ F 25V E
164	CE0075	22 μ F 16V E
165	0075	22 μ F 16V E
166	CQ0265	2200pF S
167	CQ0265	2200pF S
168	CE0075	22 μ F 16V E
169	CE0079	220 μ F 16V E
170	0084	4.7 μ F 25V E
171	0084	4.7 μ F 25V E
172	CE0087	220 μ F 25V E
173	0079	220 μ F 16V E
174	CK0155	0.01 μ F C
175	CE0090	1000 μ F 25V E
176	0090	1000 μ F 25V E

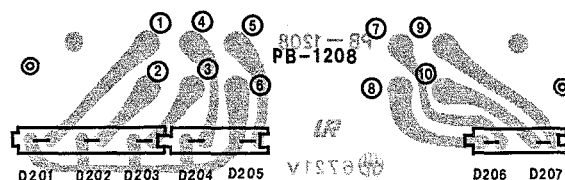
SYMBOL NO.	STOCK NO.	DESCRIPTIONS
C201	CK0156	0.022 μ F C
202	CK0158	0.047 μ F C
203	0158	0.047 μ F C
204	0156	0.022 μ F C
205	0156	0.022 μ F C
206	0158	0.047 μ F C
207	CE0074	10 μ F 16V E
208	0168	3.3 μ F 50V E
209	CQ0168	0.018 μ F M
210	0024	1500pF M
211	0157	0.018 μ F M
212	CK0155	0.01 μ F C
213	0158	0.047 μ F C
214	CE0074	10 μ F 16V E
215	CK0156	0.022 μ F C
216	CE0079	220 μ F 16V E
217	CK0158	0.047 μ F C
218	CC0004	22pF C
219	CQ0172	330pF S
220	CC0013	15pF C
221	CE0084	4.7 μ F 25V E
223	CK0126	1000pF C
Cx	CQ0218	750pF S
Q101	---	
102	TR0233	2SC535 B
103	TR0019	2SC1923 O
104	---	
105	---	
106	---	
107	TR0019	2SC1923 O
108	TC0099	LA1231 FM IC
109	TR0174	2SC1345 [TO-92]
110	TC0100	μ PC1173C MPX.IC
111	TR0198	2SC1815 GR
112	TR0198	2SC1815 GR
113	---	
114	TR0198	2SC1815 GR
115	---	
116	TC0021	HA1197 AM IC
117	TR0198	2SC1815 GR
118	TR0047	2SD235 Y
Q301	TC5002	NJM4558D IC
D105	TD0116	1S2075 Diode
106	TV0004	KB-265 Varister
107	TD0116	1S2075 Diode
108	TD0116	1S2075 Diode
109	TV0004	KB-265 Varister
110	TD0079	WZ-140 Zener
111	TD0144	SVB10-100 Diode
VR101	RT0054	300 ohms
102	---	
103	RT0052	20k ohms
104	RT0025	4.7k [B]
105	RT0085	100k ohms
106	RT0056	50k ohms

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
T101	LA1147	LUX1147 FM Trans
102	LA1148	LUX1148 "
103	LA1073	LUX1073 AM OSC Coil
104	LA1098	FSN-1067 "
105	LA1100	LA-1100 "
L101	LA1143	S-470K Choke Coil
102	LA1149	S-180J "
103	LA1149	S-180J "
F101	LA1829	FM Ceramic Filter Kit
102	LA1829	
104	LA1829	Anti Birdie Filter [S]
105	LA1192	
106	LA1191	Low Pass Filter
107	LA1191	"
FS101	BF0085	Fuse 0.75A [E] [U]
102	BF0207	Fuse 5x20 630mA [S]

PB1206A



SYMBOL NO.	STOCK NO.	DESCRIPTION
	TD0149	LED LD-002R
	TD0150	LED LD-003R

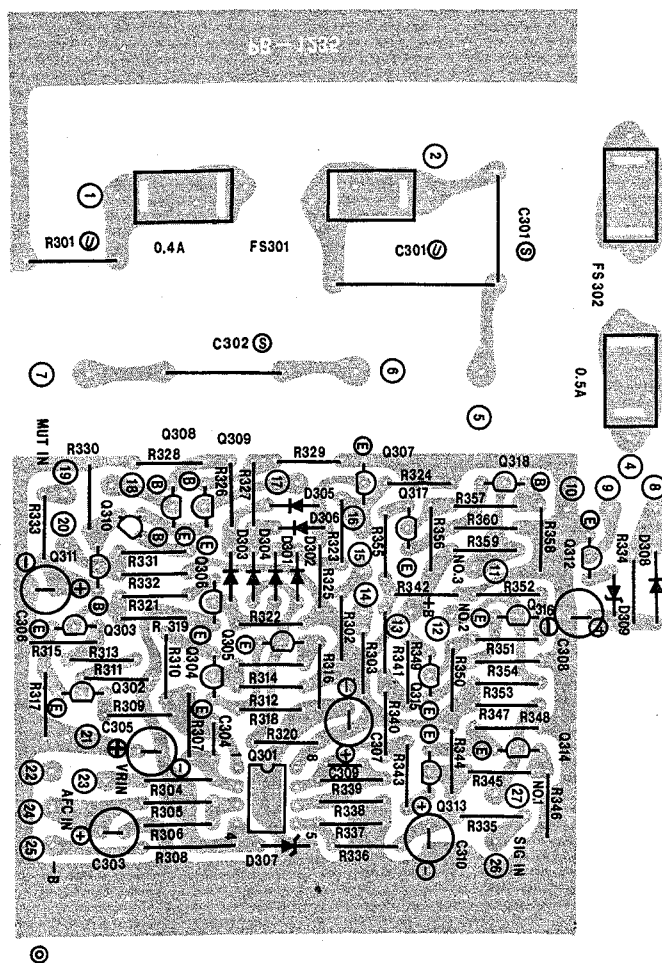


PB1235

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
R301	RD0100	R-50 2.2M
302	RB0184	R-25 1.2k
303	0184	" 1.2k
304	0206	" 10k
305	0206	" 10k
306	0242	" 330k
307	0242	" 330k
308	RD0134	R-50 470
309	RB0206	R-25 10k
310	0206	" 10k
311	"	" "
312	"	" "
313	"	" "
314	"	" "
315	RB0222	R-25 47k
316	"	" "
317	0158	" 100
318	0162	" 150
319	0206	" 10k
320	0206	" 10k
321	0222	" 47k
322	0206	" 10k
323	0222	" 47k
324	0222	" "
325	0214	" 22k
326	0222	" 47k
327	"	" "
328	"	" "
329	"	" "
330	RB0152	" 56
331	0198	" 4.7k
332	0184	" 4.7k
333	0206	" 10k
334	0250	" 680k
335	0214	" 22k
336	0198	" 4.7k
337	0250	" 680
338	0218	" 33k
339	0250	" 680k
340	0174	" 470
R341	RB0174	R-25 470
342	0174	" 470
343	RB0206	" 10k
344	0206	" 10k
345	0222	" 47k
346		
347	RB0198	R-25 4.7k
348	0150	" 47
349	RS0206	" 10k
350	RB0206	" 10k
351	0222	" 47k
352	0206	" 10k
353	0198	" 4.7k

SYMBOL NO.	STOCK NO.	DESCRIPTION
354	0150	" 47
355	0206	" 10k
356	0206	" 10k
357	0222	" 47k
358	0206	" 10k
359	0198	" 4.7k
360	0142	" 22
C301	CU0006	AC Capacitor 0.022μF[E]
	CU0065	AC Capacitor 0.022μF[U]
	CU0033	AC Capacitor 0.022μF[S]
302	CU0006	AC Capacitor 0.022μF[E]
	CU0033	AC Capacitor 0.022μF[S]
303	CE0213	0.47μF 50V E
304	CK0126	1000pF C
305	CE0074	10μF 16V E
306	CE0098	1μF 50V E
307	CE0074	10μF 16V E
308	CE0075	22μF 16V E
309	CK0126	1000pF C
310	CE0099	2.2μF 50V E
Q301	TC5002	NJM4558D IC
302	TR0087	2SA1015 Y
303	TR0087	2SA1015 Y
304	TR0230	2SC458 BC
308	TR0230	2SC458 BC
309	TR0230	"
310	TR0230	"
311	TR0230	"
312	TR0174	2SC1345 [TO-92]
313	TR0230	2SC458 BC
314	TR0230	"
315	TR0230	"
316	TR0230	"
317	TR0230	"
318	TR0230	"
D301	TD0116	1S2075 Diode
302	TD0116	"
303	TD0116	"
304	TD0116	"
305	TD0116	"
306	TD0116	"
307	TD0164	HZ12 C-3 14V Zener
308	TD0018	1K188FM-1
309	TD0159	HZ9 C-1 9V Zener

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
F301	BF0072	Fuse 0.3A [EK] [EZ]
302	BF0216	Fuse 5x20 125mAT [S]
	BF0073	Fuse 0.4A [U]
	BF0074	Fuse 0.5A [U]
	BF0074	Fuse 0.5A [E]
	AH0003	Fuse Holder [E][U]
	AH0004	Fuse Holder[S]



PB - 1235

REPLACE WITH SAME TYPE 250V FUSE ONLY. REMPLACER PAR UN FUSIBLE DUMÊME TYPE 250V.

REAR PANEL

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
	AT0013	2P Pin Jack
	AT0053	SP Terminal
	BX0027	Antenna Holder
	LA1146	Loopstick Antenna
	PT2301	Power Transformer[U]
	PT2302A	Power Transformer[S]
	PT2344	Power Transformer[E]
	UC1121	Rear Panel [E] [S]
	UC1129	Rear Panel [U]

SUB PANEL

STOCK NO.	DESCRIPTIONS
AL0050	Lamp 12V 0.1A
BX0022	Pulley No. 7017
BX0029	Pulley (small) 13mm
RV0208	VR 50k-B (muting threshold)
SP0108	1-key (LW select) Push Sw.
SP0110	3-key Push Sw. (AM, FM, mono)
TD0096	SLC25UR (red) LED
UB1045	Sub Panel
UX1011	Fly Wheel
WM1046	Dial Scale

CHASSIS

STOCK NO.	DESCRIPTIONS
AC0013	AC Selector Socket (E)
AC0014	AC Selector Plug (E)
BX0016	Dial Drum
BX0038	Dial Spring
LA1052	Balun
SP0113	Push Sw. (power) (U)
SP0114	Push Sw. (") (E)(S)
UA1052	Chassis
UZ1163	Dial Pointer
WN0007	Leg T-C
UE1097	Bottom Plate
UG1017	Bonnet (U)
UG1018	Bonnet (E)(S)
WA1183	Front Panel
WH1082	Knob Set (tuning)
WH1083	Knob Set (muting threshold)
WJ1089	Mould Knob (power)
WJ1107	Mould Knob (AM, FM, mono, muting)

PB1237[MW/LW CONVERTER PCB] [T-2L only]

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
R401	RB0204	R-25 8.2K
402	0218	" 33k
403	0192	" 2.7k
404	0150	" 47
405	0134	" 10
406	0204	" 8.2k
407	0222	" 47k
408	0192	" 2.7k
409	0150	" 47
410	0134	" 10
411	0226	" 68k
	SP0119	Push Sw. (LW/MW)
C401	---	
402	---	
403	CK0156	0.022 μ F C
404	CK0156	0.022 μ F C
405	CC0013	15pF C
406	CQ0172	330pF S
407	CC0012	10pF C
408	CK0156	0.022 μ F C
409	CC0004	22pF C
410	CQ0205	15pF S
411	CC0006	47pF C
412	---	
413	CK0156	0.022 μ F C
417	CC0006	47pF C
---	CC0082	27pF C
Q401	TR0233	2SC535 B
402	TR0233	2SC535 B
D403	TD0018	1K188FM-1
TC401	CT0008	Trimmer
		Condenser
402	CT0008	Trimmer
		Condenser
403	CT0008	Trimmer
		Condenser
404	CT0008	Trimmer
		Condenser
T401	LA1073	AM OSC Coil
402	1095	LW OSC Coil
L401	LA1176	Choke Coil
402	LA1176	Choke Coil
R126	RB0155	R-25 10k
201	0156	R-25 22k
204	0156	R-25 22k
205	0156	R-25 22k
215	0156	R-25 22k

SYMBOL NO.	STOCK NO.	DESCRIPTION
D110	TD0164	HZ12 C-3 14V Zener
	LA1117	Loopstick Antenna for AM
	WM1048	Dial Scale
	WA1184	Front Panel
	WJ1107	Mould Knob (FM,AM,MW/LW, muting/mono)
	LA1910	Front End
	UC1106	Rear Panel

SPECIFICATIONS

< FM Section >

Receiving Frequency:	87.5MHz – 108MHz	
50dB Quieting Sensitivity:	75 μ sec. 14.8dBf (3.0 μ V), 50 μ sec. 15.5dBf (3.3 μ V)	
IHF Usable Sensitivity:	10.8dBf (1.9 μ V)	
Signal to Noise Ratio:	75dB	
Frequency Response:	30 – 15kHz (within \pm 1dB)	
Total Harmonic Distortion	(mono)	(stereo)
100Hz:	0.15%	0.3%
1kHz:	0.15%	0.3%
6kHz:	0.3%	0.5%
Capture Ratio:	1.5dB	
Adjacent Channel Selectivity:	10dB (\pm 200kHz)	
Alternate Channel Selectivity:	75dB (\pm 400kHz)	
Spurious Response Ratio:	80dB	
IF Response Ratio:	80dB	
Image Response Ratio:	55dB	
AM Suppression Ratio:	55dB	
Stereo Separation:	44dB (100Hz), 48dB (1kHz) 38dB (10kHz), 38dB (1kHz, European type with optional birdie filter)	
Subcarrier Product Ratio:	65dB	
SCA Rejection Ratio:	60dB	
Output Voltage:	1V	
Output Impedance:	100 ohms	
Muting Threshold:	10 μ V – 300 μ V	
< AM Section >	(MW)	(LW for the T-2L)
IHF Usable Sensitivity:	250 μ V/m	500 μ V/m
Image Ratio:	50dB (45dB for the T-2L)	32dB
IF Rejection Ratio at 1MHz:	40dB	24dB
Signal to Noise Ratio:	50dB	50dB
Total Harmonic Distortion:	0.6%	0.6%
Output Voltage 30% mod.:	0.3V	0.3V
Power Requirement:	10W	
Additional Features:	Center Indicator, Signal Strength Indicator, FM Muting Switch, FM Muting Level Control	
Dimensions:	438(W) x 331(D) x 84(H)mm (17-1/4" x 13-1/32" x 3-5/16") (including legs, rear protrusions and knobs.)	
Weight:	Net: 5.8kgs (12.8 lbs.)	Gross: 7.3kgs (16.1 lbs.)

Specifications and appearance design subject to change without notice.

